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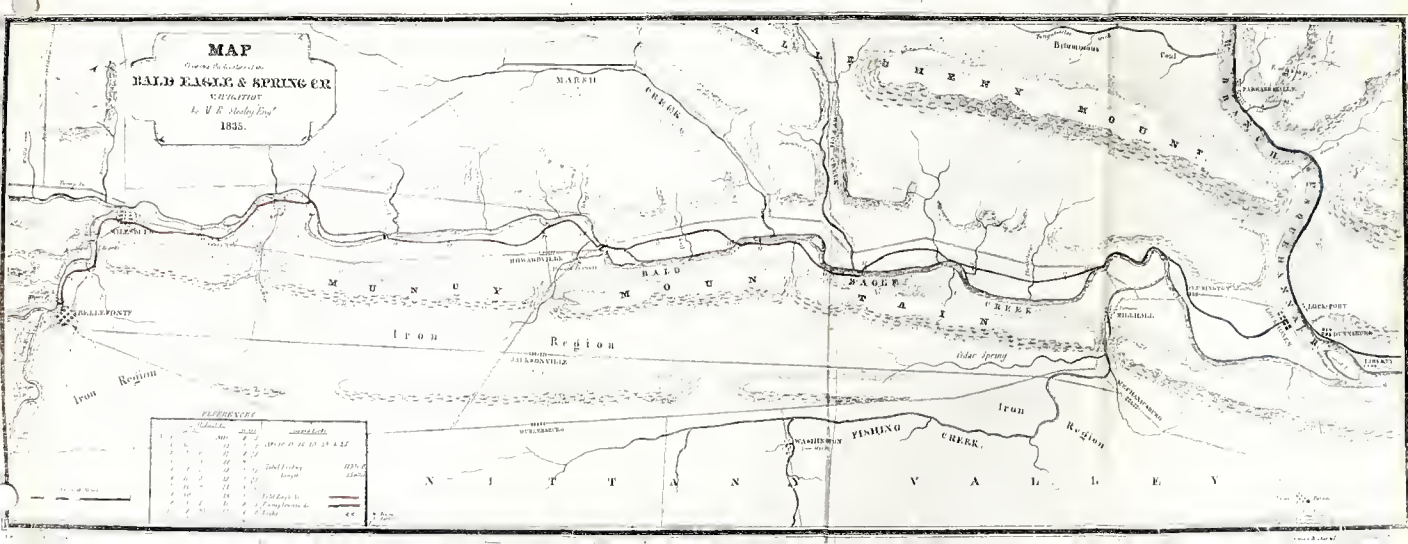
Showing the location of the

RAID EAGLE & SPRING CR

N. H. 16.17107

by V. R. Stanley Esq.

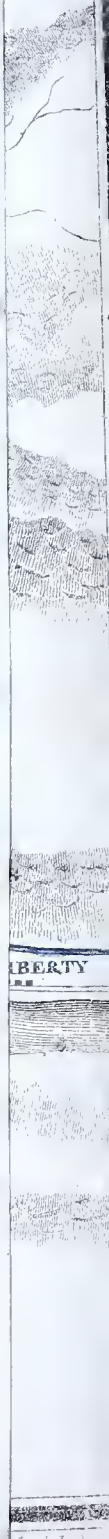
1835.



REFERENCE

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Scale 10 miles



LIBERTY

THE
FIRST REPORT

OF THE
PRESIDENT AND MANAGERS

OF THE
BALD EAGLE AND SPRING CREEK
NAVIGATION COMPANY,

TO THE
Legislature of Pennsylvania,

AND THE
Stockholders.


1835.

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REPORT

OF THE PRESIDENT AND MANAGERS OF THE

Bald Eagle and Spring Creek

NAVIGATION COMPANY.



THE deep interest which the Commonwealth has in the due execution of the work, as well as the anxiety of the Stockholders (who principally reside at a distance from the line of Navigation) to have a judicious expenditure of their money, imposes a powerful obligation for this *Report*—although not required by any special provision in the act of incorporation.

The President and Managers deem it their duty to present a full view of the progress of the Company, the state of the work, and the difficulties which the Stockholders and the Company must surmount, to complete the objects and views of the Legislature.

On the 14th of April, 1834, the Legislature passed the act authorizing the Governor to incorporate "The Bald Eagle and Spring Creek Navigation Company." The Commissioners named in that Act, were unable to obtain subscriptions to the capital stock of the Company. Last winter, the citizens of Centre county again applied to the Legislature, who, with a generous and correct liberality, on the 7th of April last, passed a supplement to the Act before mentioned, by which they pledged the faith of the State for the payment of an interest of five per cent. per annum, payable half-yearly to those who should become subscribers to the Stock of the Company, on a sum not exceeding \$200,000, for a period of 25 years.

Books were opened in Philadelphia, in conformity with this Act, and the sum of \$180,000 obtained at a premium of one-eighth of one per cent. on the 18th day of May last; and on the 30th of the same month, the balance of the Stock reserved for Centre county was taken in Bellefonte, at the same premium.

The whole premium obtained, being \$ 500, was immediately paid to the State Treasurer, for the use of the Commonwealth.

The Letters Patent were issued by the Governor, on the 5th day of June, and the election held on the first Monday in July last, when the Board was duly organized, by the selection of the following Officers, viz:—

PRESIDENT—THOMAS BURNSIDE.

MANAGERS.

ROLAND CURTIN,	WILLIAM W. POTTER.
JOHN RANKIN,	JAMES IRVIN,
HAMILTON HUMES,	WILLIAM A. THOMAS,
BOND VALENTINE,	FRANCIS R. POTTS,
JACOB LEX,	JOSEPH HARRIS.

TREASURER—JOHN G. LOWREY.

James Gregg was selected by the Board for Secretary. He shortly after resigned, and *Henry Petrikin* was duly chosen his successor.—

Previous to the election, preliminary arrangements had been made for the organization of an efficient Engineer corps. On the 2nd Monday in July, they commenced the location of the Canal. The corps consisted then, as now, of

M. R. STEALEY,	<i>Principal Engineer.</i>
CHARLES S. BAIRD,	} <i>Assistants.</i>
DAVID MITCHELL, JR.	

The Board early directed that the dimensions of the Canal should be as follows:—Width at bottom, 20 feet—Surface, 36 feet, with a depth of four feet water. The inner slopes to have a slope of 2 base to 1 perpendicular, and the outer slopes $1\frac{1}{2}$ base to 1 perpendicular. Both banks are to be six feet in height above the plane of the bottom of the Canal. The towing-path to be nine feet wide on top, and the berm bank six feet. The Engineer having authority to make such variations from the dimensions, as particular circumstances may require.

The Locks were directed to be of the same size as those on the Susquehanna division of the Pennsylvania Canal, 90 feet long and 17 feet wide in the chamber, of good stone rubble masonry work, lined with plank.

The President and Treasurer, under the direction of the Board, made arrangements with the Western Bank of Philadelphia, for the keeping of a Stock transfer book, under the care of the intelligent officers of that institution; but no transfer is permitted by the Board when a call is due on the Stock and

mpaid. Further arrangements were entered into of mutual advantage, for keeping the deposits of the Company in that Bank, and the Bank collecting the instalments called on the Stock, and paying the interest agreeably to the guarantee of the Commonwealth.

The Officers of the Company assumed the 1st of January, and the 1st of July, as the most convenient days for making all calculations of interest, being equally advantageous to the Government as well as the Corporation; which they are happy to find, meets the approbation of the accountant department of the State.

On the 22nd of August, the Engineer made an elaborate report to the President of the Board, which is herewith printed, and which, on due consideration by the Board, was adopted, with a small variation near Curtin's rolling-mill.

The first letting was had on the 10th of September, of all that part of the line between the Pool of the State dam and Butler's place, a distance of $12\frac{1}{2}$ miles, including the entrance lock of the dam near Howard Furnace, and the tow-path on the pool of the State dam.

This division, besides the excavation, embraces three dams and ten locks. The contractors are now at work on every part of it, and when completed will be immediately opened for business. It is the intention of the Board to finish this division of the work for navigation purposes, with as little delay as possible. The contractors are bound to have their jobs completed in the first of September, next; and should the season be favorable, it is believed that this part of the line will be opened for navigation by that time.

The excavation, locks and dams on the upper division, were let on the 19th day of October, extending from Howard furnace to Bellefonte: in extent about the same as the lower division; embracing 18 locks and 2 dams. Some of the contractors are at work. Several of the Board were among the most favorable bidders. Part of the work must necessarily throw idle the forges, rolling-mill, merchant mill, &c. of Roland Curtin, and the forge, rolling-mill, &c. of Irvin, Green & Co. It was therefore, desirable that those gentlemen should become contractors for the work connected with their Manufactories, while it was their interest to be the most favorable bidders. Previous to any work being allotted to Managers of the Company, the Board unanimously passed the following resolution:—

“Resolved, That no work on the line of Canal shall be allotted to any individual, during the time the said individual, or individuals, remain members of the Board of Managers.”

In pursuance of this resolution, Messrs. Joseph Harris, John Rankin, James Irvin and Roland Curtin resigned their seats in

the Board, and work was allotted to them. Their places have since been filled, agreeably to the provisions of the act of incorporation, by Gen. Wm. Houston, Dr. John Harris, James Burnside and James Gilliland.

A recent detailed report of the work, made by the Engineer to the President, embraces the following summary of expense:—

Sections, - - - - -	\$ 67, 125
locks, and lock sections and water ways, -	125, 738
dams, and dam sections, - - - -	15, 109
4 crossing bridges, on slack-water, - -	5, 000
6 towing path bridges, - - - -	500
50 road and farm bridges, - - - -	17, 500
20 fordings, - - - - -	2, 000
waste wiers and paved wastes, - - -	5, 000
4 sets of head gates, - - - - -	1, 000
fences, - - - - -	5, 000
culverts, - - - - -	1, 000
unforeseen contingencies, - - - -	5, 000

Aggregate, \$ 249, 882

To this, in the opinion of the President, } may be added:—two Collectors' houses, expenses of Management—pay of En- gineer corps—damages to lands & hous- es—printing & other contingent exp's. }	25, 118
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Making a total expense of \$ 275, 000

Pursuing, as the Board do, in every department, the most rigid economy, it may be assumed that the sum of \$ 275, 000 will finish and complete the navigation, and discharge every fair and just demand that can or ought to be brought against the Company.

The next inquiry is, how is this balance of \$ 75, 000 to be raised? It is essential to the economical completion of the work, that the means of raising it should be soon known. Early next spring, the toll-houses, farm and road bridges, should be put under contract; as well as waste wiers and paved wastes. Crossing bridges should not be neglected; and there are some just claims for damages, which should be discharged.

It is respectfully submitted to the Legislature, to adopt one of the three following modes of raising the sum of \$ 75, 000, as the same may be required by the Company:—

1. A further guarantee of 5 per cent. for 25 years on that sum—or

2. The State to subscribe that amount in the Capital Stock of the Company—or

3. Authorize the Company to borrow the amount on the faith of the Tolls. Authority being given, it is believed that no difficulty will arise in obtaining the money. The tolls on the lower division alone, when opened for navigation, will exceed \$ 7, 000 annually.

That the Stockholders may know when instalments will be required; to give certainty to sellers as well as purchasers when payment will be wanted; and to enable those who wish to make investments to know with certainty when the interest will commence, as well as to enable the Company to prosecute the work with vigor, as far as the present funds of the Company will extend, the Board have directed that the balance of the \$200, 000 be paid as follows :—

Five dollars on each share,—1st March, 1836.

Five do. do. do. 1st April, “

Five do. do. do. 1st June, “

Five do. do. do. 1st July, “

Five do. do. do. 1st August, “

Five do. do. do. 1st Septem. “

Five do. do. do. 1st October, “

Five do. do. do. 1st Novem. “

These calls, with the three dollars paid at the time of subscribing, and the five dollars on each share on the 1st of October last, includes the whole amount of subscription.

The Board have resolved to enforce the penalty of one per cent. per month, on delinquent stockholders, after the 31st of December, 1835; which is contained in the 8th section of the Act of incorporation, of which due notice has been given.

It was found that the banks of the Creek were too low for slack-water, and there was a necessity for frequent crossing: this increases the number of guard locks, and adds to the expense.

The attention of the President of the Board has been specially called to the subject of dispensing with lock-houses and lock-keepers, and compelling the captains and commandants of boats to open and shut the locks and gates, *as is done on the public works in the State of Ohio.*

Pains have been taken to collect information, and carefully to examine the subject. It is believed, that an authority being given by the Legislature for the Company to make by-laws, and proper and necessary rules and regulations, a system can be established, (especially on this Canal, where almost every man who navigates it is interested in its preservation,) which will save a large annual expense. It is hoped the Company will, if proper and necessary powers are allowed, establish a

precedent for economical management, that will be followed in similar cases.

It is essential to the preservation of the Bald Eagle and Spring Creek Navigation, that it should be included within the provisions of the Act entitled, "An act to protect the public in the full benefit and enjoyment of the works constructed for the purposes of inland navigation," passed the 10th day of April, A. D. 1826.

The exertions and labors of the Board have been greatly relieved and assisted by the intelligence, judgment and economy of the Engineer, whose professional skill and ability are deserving of the highest praise.

By order of the Board,

TH. BURNSIDE, PRESIDENT.

Bellefonte, Dec. 12, 1835.



REPORT

ON THE

SURVEY AND LOCATION

OF THE

BALD EAGLE & SPRING CREEK NAVIGATION:

made, August 22, 1835.

BY M. R. STEALEY, ENGINEER.

*To Thomas Burnside, President of "The Bald Eagle
and Spring Creek Navigation Company."*

SIR—

HAVING completed the survey and location of the Bald Eagle and Spring Creek Navigation, I have the honor to communicate the result in the following report.—

The whole length of line from the bridge at Bellefonte, to the State dam on the Bald Eagle, is 25 miles and 25 perches; of which 20 miles will be Canal, and 5 miles 25 perches slack-water. The total lockage is $183\frac{1}{4}$ feet, requiring 22 lift locks and 6 guard locks. There are five new dams to be constructed, and five mill-dams, to be increased in height, and repaired.

The obvious importance of this improvement, extending into the very centre of the State, and passing through a section of country second to none in Pennsylvania, in mineral and agricultural resources—seems to demand, that it should be constructed in a permanent manner;—and other considerations seem equally to demand, that a judicious economy should at the same time be exercised in its construction.—It therefore becomes an important consideration, to decide on the adoption of such plans, and to make such a location, as would embrace both these conditions to as great an extent as practicable.

The lockage is a very heavy item on this line, and will form a large proportion of the whole cost of the improvement.—The comparative cost of locks depends only in a very slight degree upon the width of the chamber. The side walls, &c. must be of equal strength for a narrow lock as a wide one; the principal difference in cost therefore would be caused by the difference in width of the foundations of each.—The locks on the State Canal, (of which this may be considered an extension) are 90 feet long by 17 feet in width, in the chambers: and as no

important saving in the first cost, could be effected by adopting locks of smaller and perhaps inconvenient dimensions ; it is therefore recommended that the locks should be built of the above dimensions, particularly as a superabundance of water exists on this line at all seasons, to supply an extreme lockage.

The valley of the Bald Eagle abounds in stone of a suitable quality for rubble work, but not for regular masonry.—I would recommend therefore, that the sides of the locks be built in uncoursed rubble work, laid in common lime mortar ; with wooden hollow quoins, coping, and planked chamber ; all the wood work to be secured to the walls by iron bolts in such a manner as to admit of being easily replaced when necessary. The walls, foundation and gates are as durable as those of a cut stone lock, and the lining of the chamber will probably last from ten to twelve years ; at the end of which period it can be renewed at a small expense, whilst the navigation is closed in the winter season.—This description of lock combines permanency with economy in an eminent degree, and is better suited than any other to the character of the materials which can be procured along the route.—Wooden locks are miserable alternatives, and should never be countenanced when stone can be procured.

The destruction of many of the dams on the public works in this State, may be mainly attributed to glaring defects in the original plan.—Dams on gravel foundations were frequently built nearly vertical on the lower side, and on a timber apron which was intended to prevent the dam from undermining.—This plan, however well it was made to appear in theory, resulted but indifferently in practice. The effect was, that the water, tumbling over the dam in nearly a vertical direction, undermined the apron, which then (with the force of water falling on it) operated as a powerful lever to overthrow the whole structure, and instead of being a protection was a positive evil. Occasionally the apron was torn away by the violence of the floods—the whole of the stone filling in the cribs fell through—nothing more than the shell of the dam then remained, and this was shortly followed up by the total demolition of the whole structure.

In order to counteract those disastrous effects as much as practicable, I propose to build dams on gravel foundations in the following manner.

The dam is to be formed of unhewn timber laid up in crib-work in the usual manner—with either timber or stone abutments. The upstream side is to have a slope of 5 base to 1 perpendicular, the comb of the dam is to be 3 feet in width on top, and the lower or down stream side have a slope proportional of 3 base to 1 perpendicular, except that the toe of the dam will be vertical on a height, equal to about one-third of the whole

height of the dam. The dam will rest upon a layer of poles 6 inches in diameter at the larger end, laid parallel to the thread of the stream, and projecting about 6 feet below the termination of the lower slope. All the cribs to be filled with stone well packed in, except that at the toe of the dam, which is to be left empty. A row of plank piling will be placed in a vertical position at the foot of the upper slope, and extending below the bed of the stream. Both slopes and the comb are to be covered with 4 inch oak plank, well spiked on. The dam is then to be gravelled to a distance on the upper side proportional to its height.

The water in passing over a dam constructed on this plan, glides smoothly over the lower slope, and strikes the bed of the stream at an angle so oblique as to have but little effect on it—the projecting poles tend to diminish this effect, by checking the force of the current, and in consequence of their elasticity do not operate injuriously, (as in the case of a solid apron) when undermined. Even should the dam undermine to a distance of 8 or 10 feet, which is highly improbable, we are still prepared for this contingency, by having left the front crib empty—the undermined portion of the dam is then light, which is obviously an advantage, the poles retain their position, and have a tendency to produce the same effect as at first; and the weight, upon which the permanency and safety of the structure depends, is placed above a point, beyond which the dam cannot possibly undermine. A dam built on this principle will, I feel confident, retain the position in which it may be placed, as long as the materials used in its construction will endure.

As this line passes through a well cultivated country, the number of crossings required will be unavoidable great. The paved fordings which the Act contemplates, cannot be adopted where the line is taken along the foot of a steep ridge, as it is in many instances. The depth of water at those fordings is limited to 40 inches, being 8 inches less than at other places. This also forms an objection to them, on a line where lock-keepers may be dispensed with; and the levels consequently liable to become so low occasionally, as not to afford a sufficient depth of water on the fordings for the passage of heavily laden boats. The first cost however will be light, and as economy is a ruling principle with us, fordings will be adopted where practicable. Should they in process of time prove to be a serious obstruction to the navigation, they can be replaced by bridges, if thought expedient.

Pivot bridges are also objectionable, in consequence of the delay occasioned in passing them, and their liability to get out of order. The first cost also, if properly constructed, will not fall much short of the cost of a common bridge with embankments.

A few however may be advantageously adopted, where high bridges would be inconvenient.

The most eligible bridge would be, such as is commonly used on canals, with a plain superstructure of about 34 feet in length, supported on wooden or stone abutments. One embankment only, would be required in many places, and the navigation would remain free and unobstructed.

The towing bridges required at those points where the line is transferred from one side of the stream to the other, will have plain superstructures resting on piers and abutments of frame work filled in with stone and planked.

For a further and more minute description of the locks, dams, &c. I would refer the Board to the plans and specifications accompanying this report.

The minimum size of the Canal, was fixed by a resolution of the Board of Managers, at 20 feet width on bottom, 36 feet surface line, and 4 feet depth of water. The tow-path bank will be 9 feet wide on top, and the brim-bank 6 feet. Inner slopes 2 base to 1 perpendicular, and outer slopes $1\frac{1}{2}$ to 1 perpendicular. An increased width of surface can be attained on a large proportion of line, without incurring additional expense—so that upon the whole, this Canal may be considered as equal in size to the Pennsylvania Canal for all practical purposes.

The location of the line was commenced on the 13th ult. and conducted with much pains—with a due respect to the views of individuals interested in the various routes examined; and with a desire to make such a location as would occasion no unnecessary injury, and would confer advantages on private property, when practicable; without compromising stability of construction—incurring additional expense—or adopting a circuitous route between points fixed, either by nature or by law. And finally, that the route recommended to the Board for their sanction, should be such as would best fulfil the objects of this important undertaking, and make it what it was intended to be—a public benefit.

For convenience of reference, and in order to preserve perspicuity, as well as to afford facilities for comparing the relative advantages of different routes examined—I propose to divide the line into sub-divisions, each of which will be considered separately.—

FIRST DIVISION—Commencing at Bellefonte, and terminating at Messrs. Irvin, Green & Co.'s rolling-mill dam—length, 1. 72 miles.

By a resolution of the Board, dated 11th July, the Engineer was “directed to commence the location of the navigation in Spring Creek opposite the town of Bellefonte, so as to give four

feet water immediately above the bridge at the west end of High Street in the said town."

The eastern bank of the creek, is high and steep, and is composed of a compact limestone rock, covered with a thin stratum of clay, which character it maintains with little variation, for a distance of about half a mile below the town. At this point the creek diverges from the general range of the hill, and alluvial flats of considerable width intervene, and occupy the remaining distance to station No. 34,* at the head of the pool formed by Jones & Green's dam, situated in a gap of the Muncy mountain. From the head of the pool to the dam at station 42, the base of the mountain on either side, approaches the water's edge. This pool can be made available for slack-water, at a trifling expense, by clearing it of old logs, stumps, &c. and the formation of a towing-path along it, parallel with the Bellefonte and Philipsburg turnpike road. The western bank of the creek is low and marshy for a short distance below the bridge, it then becomes higher gradually to a point a short distance above the commencement of the flats on the opposite side. The ridges then recede, and form the valley of Buffaloe Run, which comes in across a low marshy flat, which skirts the base of the hill for half a mile; at this point Spring Creek washes the steep base of the Muncy mountain, along which it continues through the gap, and nearly to its junction with the Bald Eagle.

Commencing then at the bridge (which must be raised in order to admit the passage of canal boats under it,) such a level was assumed, as to yield the requisite depth of water, by clearing the bed of the creek to a depth of about one foot, and the scite chosen for the feeder dam at station No. 5, a short distance above John Hall's workshop. This dam will be 150 feet in length and 7 feet in height.

From this point to station No. 10, at the mouth of Mr. Thomas's tail-race, two modes of improvement are feasible, one by slack-water, and the other by a continuous canal on the eastern side.

On the first plan, lock No. 1, of 7 feet lift and 2 feet guard, would be located on the western side of the creek immediately below the dam, and in Mr. Thomas's tail-race, which runs along the margin of the creek to station No. 10. The race would be enlarged to the requisite dimensions for canal, to a point opposite the paper mill, and a new tail-race excavated nearer the ridge on the same distance. From this point to the proposed scite of the dam, a strong artificial bank would be required to support the water in the dam, and separate it from the race, the

* Each Station is 72 yards in length.

mouth of which would be below the dam. The bank would form the towing-path along the pool. The dam would be 150 feet in length and $6\frac{1}{2}$ feet high. As the eastern side of the creek below this point is decidedly the most favourable route, it would therefore be necessary to cross on this pool, which could be effected by forming a towing-bridge on the comb of the dam, as the creek, I am informed, seldom rises to a height of more than 18 inches or two feet above its habitual level. The canal would then commence, and continue along the flats before described, to the pool of Irvin's dam. In order to avoid the expense of a guard-lock at the proposed dam, it would be necessary to raise and strengthen the bank from the dam to lock No. 2, at station No. 17, which should in that case have 2 feet guard in addition to the lift.

On the second plan.—John Hall's machine shop, situated at the foot of a limestone bluff, and occupying a portion of the original bed of the creek, should be removed, and its site occupied by lock No. 1, of the same lift and guard as before. The canal would then commence at this lock, and continue along the margin of the creek to lock No. 2, at the head of the flats, and so on to Irvin's dam as before.

The first plan is objectionable for several reasons, amongst which the principal ones are as follows, viz:—Lock No. 2 must necessarily be situated one quarter of a mile below the proposed dam, the bank of the canal on a portion of this distance will rest on a smooth limestone rock, and it will consequently be difficult to prevent leakage, and its concomitant evil—breaches. Should an additional depth of water be thrown into the canal (as in time of freshets) the risk from the above causes would be very materially increased. The same objection may be made in relation to the guard bank dividing the pool from the tail-race. Should a breach take place in either of these banks, particularly the guard bank, it would be attended with very disastrous consequences, and produce incalculable damage and interruption to the water power and navigation. The dam would also require renewing after a lapse of years, and finally, the first cost on this plan, would exceed that of a canal on the eastern side, by a sum of at least \$1,000.

The principal objection to the second plan is, that it renders necessary the removal of Hall's shop and machinery. This however will not be a serious item of expense, as the building is small and in a delapidated condition; and as a water power far superior to the present, will be created at this point, the advantages are stability, economy, and public convenience; the latter by affording the best public landing in the Borough, at the foot of Lamb street.

It is therefore recommended, that the second plan, viz. a continuous canal on the eastern side be adopted.

From lock No. 2, of 10 feet lift, the route runs over very favorable ground, along the foot of a ridge to station No. 28, in Mr. Stewart's meadow. At this point the ridge diverges abruptly from the line, and forms an extensive recess or valley to the right, across which the turnpike road is constructed. The ground then becomes too low for our level, and the meadow forms a regularly descending plane to the surface of Irvin's pool; and therefore, as lock No. 3 must be dropped to the level of this pool, it will be necessary to encounter either double embankments above, or deep cutting in marshy ground below the lock. —In order to avoid the latter as much as practicable, it is proposed to raise Irvin's dam one foot, and continue the line on the high level across the valley, nearly parallel with the road, by embankments, to station No. 33, opposite the toll gate; where lock No. 3, of 9 feet lift, is located. The channel from the head of the pool to the lock will be about 150 yards in length, with 6 feet cutting in a marsh. As the meadow affords no material suitable for the embankments—it must be procured from the ridges on either side of the valley.

The pool above mentioned will afford a sufficient depth for slack-water, by clearing it of stumps, logs, &c. and some slight excavations. A towing-path will be constructed along it to the end of the Division, at station No. 42.

SECOND DIVISION—Commencing at Irvin, Green & Co.'s rolling-mill dam, and terminating at the head race of Miles & Potts' mill—length, 0. 61 miles.

The Act of incorporation makes it obligatory on the Company, to take the navigation “as near the mouth of Spring Creek as practicable,” and “through and along the head races of the mill of Miles & Potts.” This therefore, is a point fixed by law, and one which renders it necessary to take a circuitous, unnatural, and comparatively expensive route, in order to comply with the requisitions of the Act. The Canal therefore, will commence at the dam, and run between the forge and coal house of Messrs. Irvin & Co., pursuing nearly a direct course to the head race. Lock No. 4, of 5 feet lift and 3 feet guard, is located at station No. 45, immediately below the coal house, a portion of which must either be removed, or a vertical wall built along it, for the support of the towing-path. Lock No. 5, of $8\frac{1}{2}$ feet lift, at station No. 53, depresses the base line to a suitable level at the head race. A new set of head gates will be required, to admit the water from the creek, and guard against freshets.

THIRD DIVISION—Commencing at the head race of Miles & Potts' mill, and terminating at the head race of Roland Curtin's rolling-mill—length, 1. 97 miles.

The town of Milesburg is situated at the upper end of this division, and immediately below the junction of Spring Creek with the Bald Eagle, which winds nearly through the centre of the valley to the end of the division, leaving extensive ranges of rich alluvial flats, and low undulating ridges on either side.

The dam at the head of this division was very loosely constructed in the first place, and is now in a very leaky and dilapidated condition. On the adoption of either of the routes examined, it would be necessary either to raise and gravel the present dam and guard bank, two feet, or to build a new dam, in order to insure an uninterrupted navigation, and yield a sufficient supply for hydraulic purposes. The latter course would be decidedly preferable, as it would be a permanent improvement; whereas the former would at best be only a temporary and uncertain resort.

Three different routes were explored on this division, which will be considered in the order in which they were surveyed.

Route No. 1, commences at station No. 57, at the head of the race, and continues along its bank to the saw-mill of Miles & Potts, on the bank of the Bald Eagle. The saw-mill would be removed, and lock No. 6, of $10\frac{1}{2}$ feet lift, constructed on its scite. This lock would form an outlet into a pool to be formed by a dam 150 feet long and 5 feet high, at the lower end of the town. The public bridge across the Bald Eagle occurs immediately below the lock, and is too low to admit the passage of canal boats under it, on the proposed pool. It would therefore be necessary to raise it, and form a towing-path in front of the southern abutment, and along that bank to the dam. The northern bank of the Bald Eagle, opposite Milesburg, is a low alluvial plain; and in order to render the work secure, it would be necessary to extend a strong guard bank along the pool of the dam, to rising ground above the bridge. A guard lock would also be required at the dam, or entrance of the canal, which would commence at this point, and by a gentle deflection pass along the foot of a gravel ridge on Mr. Valentine's flats, to station No. 76, where it would be necessary to cut through the ridge (with 6 feet cutting) in order to preserve the proper direction of the route, and avoid coming in contact with the creek. The line is then conducted along the top of the ridge or elevated plain, to station No. 91, where lock No. 8, of $9\frac{1}{2}$ feet lift, is located; and thence along an undulating ridge, to Malone's house, at which place lock No. 9, of $10\frac{1}{2}$ feet lift, is located, so as to depress the line to the level of Curtin's race; thence across a flat, with moderate cutting, to station No. 105, where this route intersects the race, and the division terminates.

Route No. 2. This route lies along the race of Miles & Potts'

mill, to Water street in Milesburg, which is 120 feet in width. The line is located through the middle of it, crossing the turnpike road at right angles, with about three feet excavation. The street descends in the direction of the route, so as to require embanking at its lower end to $6\frac{1}{2}$ feet in height, in order to form the Canal. Lock No. 6, is located at this point, and the route then connects with route No. 1, at station No. 68; the remaining distance to the end of the division being common to both.

Route No. 3. The Act requires that the "*navigation* shall be carried as near the mouth of Spring Creek as practicable," but prescribes neither the mode of improvement, nor the precise distance from the mouth of the creek within which it shall be carried. The practicability of approaching the mouth of the creek, depends in a great measure upon the particular mode of improvement adopted immediately below. The only feasible way in which the *navigation* could be taken *to it*, is by slack-water. The mean of improvement however, being left discretionary with the Company—it results, that in case a canal should be found the preferable mode, it must be taken out of the race at some point above Miles & Potts' mill. And as to the precise point, it is not reasonable to presume, that the Legislature intended any other should be chosen, than that which would be most conducive to the value of the work as a public accommodation, and do least injury to individual property. The only apparent design of the Legislature in thus restricting the discretionary powers of the Company, seems to have been to prevent injury to the water power of Messrs. Miles & Potts. This design will not only be carried fully into effect, but the water power at this point be very materially increased, and the canal at the same time "taken through and along the head race," in compliance with the express provision of the Act.

Under the above construction of the law, I proceeded to examine route No. 3, which presented some favorable features.

This route diverges from the race at a point, still higher up in the town than the last, with a view of attaining the route which nature has pointed out, as soon as the law would permit. The line is taken along the race a distance of about 150 yards, then by a deflection to the right, through a vacant lot on the west side of Main street, across that street at right angles, with about 4 ft. cutting, and through Moore's lots on the opposite side. There are two buildings on this property, one a small stone dwelling house, and the other a frame workshop, both of which must be removed. After having passed through those lots, the line pursues a direct course over favorable ground to the foot of the hill back of Milesburg. It is then continued on nearly a level plain, for $\frac{3}{4}$ of a mile; one bank only being necessary to form a

canal of any required width: the route is then maintained along side-lying ground to station No. 96, at the head of Malone's field, where lock No. 6, of 10 feet lift, is located, on a gentle declivity in the direction of the route. Two stations further on, lock No. 7 occurs, of the same lift, on the south side of the road; which is crossed with five feet cutting, and lock No. 8, of 10 feet lift, (which depresses the line to the level of Curtin's race) is located near Malone's upper house, at station No. 102, thence across a flat, to station No. 105, where the race is intersected at a very favorable point.

Upon instituting a comparison of those several routes, it appears that No. 1 is the least favorable in point of distance, stability, or economy. The length of this route is 288 yds. greater than that of No. 3. It also embraces one guard-lock, one dam, and 10, 500 yards of excavation and embankment more than on the former route. Those considerations taken in connection with the risk incurred from freshets, lead to the prompt rejection of Route No. 1.

Route No. 2, also exceeds No. 3, 200 yards in point of distance, and 8, 500 yds. in excavation and embankment. It would also occupy the greater portion of Water street, through the lower part of which it would necessarily pass by high embankments; which I have no doubt would prove a serious inconvenience to the inhabitants.

It therefore results, that Route No. 3 is the cheapest, safest, and most direct route practicable under the circumstances. The three lift locks on this division, can also, by adopting this route, be brought within a short distance of each other, which will facilitate attending to them. In fine, this route has a decided advantage over either of the others, in any point of view in which it can be examined; and I therefore recommend that it be adopted.

FOURTH DIVISION—Commencing at the head race of Roland Curtin's rolling mill, and terminating near the mouth of Bullet's run—length 4. 25 miles.

The Act provides that the "navigation shall be taken through and along the head races of the rolling-mill and forge of Roland Curtin." In accordance with this provision the line is continued along the race to station No. 110, near the rolling-mill; where it diverges to the left, taking a direct course across the flats, to station No. 119, at the mouth of the tail-race, and head of the pool, formed by the dam at Curtin's lower works. Here it is proposed to locate lock No. 9, of $8\frac{1}{2}$ feet lift, and by raising Curtin's dam 18 inches, throw the requisite depth of water into it, through a channel to be excavated in the bed of the creek, on a distance of about 200 yards, average cutting, 2 feet. Channels

of this description are objectionable in consequence of the difficulty sometimes experienced in keeping them open, but in this case it is unavoidable, as the low and extensive flats on the northern bank of the stream, forbid raising the dam to a greater extent than that proposed. The southern bank is a steep mountain side, along the face of which the towing-path will be formed along the pool to the dam at station No. 134. This dam is 180 feet in length and 5 feet in height; and is in common with all the other private dams on this stream, in a very leaky condition. The timbers of the crib-work however, are tolerably sound, and the dam *may* be raised, by laying some timbers on the upper slope, and covering the whole with four inch plank. The crib abutments must also be raised. This will be the least expensive mode, although not the most permanent. In order to insure permanency, the apron of the present dam should be cut off, and a range of new crib-work carried up to the requisite height on the lower slope, and covered with 4 inch plank. The difference in cost of the two modes is not a sufficient consideration to counterbalance the superiority of the latter, which is decidedly preferable to the first.

The dam at the upper works should also be raised about one foot, in order to obviate the necessity of sinking the bottom of the race, and to insure a sufficient supply of water for the rolling mill and canal. This can be effected by simply laying a large log on the dam, and planking on the upper side. The dam should also be gravelled, and the present guard bank raised.

The northern abutment of the lower dam is on a small island, along which a guard bank must be raised. The channel at the upper end of this island is 80 feet wide, having a temporary dam thrown across, so that a portion of the water is vented over it during freshets. By throwing a small dam across this place to the same height as the main dam, the total length of wier will be materially increased, which will have an effect to decrease the depth of the water on the comb in floods, and prevent the overflowing of the flats above, to a considerable extent. By adopting this plan, a guard bank of less dimensions will answer the purpose better than by closing up the channel with a mound of earth.

From this dam the route is taken along the head race of Curtin's lower works. The race is continued along the base of a high gravel ridge, and is generally of sufficient width and depth for the canal; the banks will however require to be raised and strengthened, which can be effected at a moderate expense.

The sluice gates at the head of the race must be removed, and lock No. 10, of 5 feet guard, built immediately below their present scite. This lock will stand open at a low stage of water,

but during freshets should be closed. As the valves to be placed in the lock gates, for the purpose of passing boats in the latter case, will not be of sufficient capacity, to vent the required supply of water for the use of the machinery, when the gates shall be necessarily closed, it will therefore be necessary to construct a water way around the lock, with proper sluice gates and fixtures for the above purpose.

At a low stage of water, a large proportion of the whole volume of the creek is required to supply the machinery of Mr. Curtin at this place; it would not therefore be advisable to feed from his dam, for any considerable distance; and hence the necessity of locking down into the creek, and taking out a new feeder at the first feasible point. This point presents itself at the scite of Lather's saw-mill dam, at station No. 165. The dam is low, but by gravelling and repairing, will afford a sufficient depth for slack-water, to station No. 169. The line is therefore taken from the lower end of Curtin's race, at station No. 149, through a log house on the bank of the race, immediately below which, lock No. 11, of $7\frac{3}{4}$ feet lift, is located, and passing by the southern end of the coal house, pursues a direct course across the flats, to station No. 161, where lock No. 12, of the same lift, depresses the line to the level of the pool above mentioned.

The creek along this pool, washes the base of a steep hill, composed of slate-rock, in thin lamina—leaving the flats altogether on the southern side; it is there deflected from its course by the hill, and sweeps across the valley, until it comes in contact with the ridge on the southern side; along the base of which it continues, to a point nearly opposite Bullet's run, leaving the flats undivided on the northern bank. The southern bank on this distance, is high and steep—very much indented by gullies, and composed of a material very difficult to excavate;—upon the whole, a very unfavorable route for a canal.

As slack-water on this route is totally inapplicable, in consequence of the limited height of one bank, and the rapid descent in the bed of the stream—it was therefore deemed advisable to cross on to the northern side of the creek, in order to avoid a circuitous and difficult route on the opposite one. The towing-path is accordingly transferred by a bridge to the northern bank.

The northern abutment of the dam before mentioned, is placed at the upper end of a large island, leaving a channel of from 70 to 100 feet in width, between it and the main land; across the head of this channel, a mound or rude dam has been thrown, immediately below which is Lather's saw-mill;—the channel forming the tail-race.

The mode of improvement proposed at this place is, to remove

the saw-mill, and part of the mound, raise a guard bank along the island, to station No. 171, at the commencement of the flats, and there construct a mound, or crib-work across the channel, so as to flow it to the same height as the water in the dam. Lock No. 13, of 5 feet guard, is located at this point, and the canal taken on favorable ground, to the Bullet's run dam; with the exception of one point a short distance below the guard lock, where the line runs around the base of a rocky precipice. Lock No. 14, of $8\frac{1}{2}$ feet lift, occurs at station No. 186, and lock No. 15, of 7 feet lift, at station No. 202, at the head of an old channel of the creek, through the flats. This lock brings the line down to the level of Bullet's run dam, which will be 150 feet long and 7 feet high; and is located at the head of an island, at station No. 209, and immediately above Bullet's run, which is a mountain torrent, coming in on the northern side of the creek.

FIFTH DIVISION—Commencing near the mouth of Bullet's run, and terminating at Tipton's—length, 3 miles.

Immediately below Bullet's run, we find the Bald Eagle at the base of a steep hill, along which it continues through nearly the whole length of this division, leaving the flats on the southern bank. Slack-water being unsuitable to the character of the creek, it therefore became expedient to cross it, in order to attain favorable ground for canal. This is effected on the pool of the dam, with the aid of a towing-bridge of 100 feet in length.

Examinations were made for the scite of a dam below the mouth of Bullet's run, the result of which was, that a dam located one quarter of a mile below the upper scite, (which is the lowest point that the height of the southern bank would permit with safety) would be very materially increased both in length and height, in consequence of the increased width of the creek, and the rapid descent of its bed. Injury would also be done to property, by overflowing low land on the margin of the stream, and destroying a saw-mill. As the first scite proved to be the best, both as regards stability and economy, it has therefore been adopted, and the route along the flats regulated in reference to it.

The canal will commence at the dam, where lock No. 16, of 5 feet guard, is located. The flats from this point to David Shick's house, at station No. 228, have a gradual and regular descent in the direction of the route, and are nearly level transversely. The cutting at the upper end will not exceed 9 feet, and at Shick's house, falls off to $2\frac{1}{2}$ feet. The line is then continued along the foot of a ridge bordering the flats, to Neff's house and distillery, where lock No. 17, of 8.75 feet lift, is located, in order to save a valuable spring. The line is then continued along a narrow strip of meadow, nearly to Bowers' house, at station No. 253, above which it crosses a ridge and the road,

with 5 ft. cutting; and pursues a direct course back of the school house, station No. 256, where it diverges from the road, in order to keep on favorable ground through the woods, above Cowperthwait's. It then emerges from these woods, and is conducted back of his house and barn, where it occupies the road, and is then conducted along side-lying ground, to the widow Tipton's house, on the southern margin of the creek.

SIXTH DIVISION—Commencing at Tipton's, and terminating at Shaw's bluff, on Willing's land—length, 4. 17 miles.

Tipton's is situated at the upper end of what is called the Howardville bluff. This bluff is half a mile in length, rising abruptly from the water's edge, to a height of 30 or 40 feet, and is composed of gravel interspersed with large stone, and resting upon an argillaceous friable slate-rock, which makes its appearance in the face of the bank. Below this bluff, flats intervene, and continue past the Howard furnace to the mountain side, along the foot of which the creek takes its course to the end of the division, a distance of $2\frac{1}{2}$ miles.

On the whole of this division, the high banks on one side, are contracted to extremely low and wide flats, on the opposite side; subject to inundation at every extraordinary freshet: which circumstances, taken into connection with the rapid descent in the bed of the creek, precludes the adoption of slack-water to any extent.

Route No. 1, was therefore examined with a view to a continuous canal, on the southern or mountain side of the valley.—Commencing at the upper end of the bluff, at station No. 282, where lock No. 18, of $9\frac{1}{2}$ feet lift, is located, the line is then taken along the margin of the creek to the head of Butler's fields, at station No. 295. The canal along this section will be formed by excavating about one-half of the canal into the bank, the material from which will form the embankment of the other part. As the current of the creek is very rapid at this place, it will be necessary to protect the bank of the canal from abrasion, by a slope or rip-rap wall. As the formation of the canal will occupy a large proportion of the whole width of the creek at one point, it will be necessary to widen the channel along the low flats on the opposite side, for a short distance. From the end of the bluff, the line is carried along Butler's meadow, at the foot of a ridge, and passing close by his house and barn, runs below the widow Platcher's house, and across the road below the Howard furnace; then by a deflection to the left, along side-lying ground, to the end of the flats and commencement of the narrows, at station No. 327. The whole of the route along the mountain side, is covered with a heavy growth of timber, and the surface of the ground, with detached masses of rock,

resting *apparently* on a stiff loamy clay. The mountain is high and steep, and consequently the water from heavy rains and melted snow, is thrown down suddenly and in great quantities. Evidences of this fact exist along the whole route. In many places the alluvial deposit has been swept off, leaving nothing but the debris of the mountain, to a depth of several feet. On the lower mile, the whole surface has been torn into gullies by the mountain torrents, several of them 20 feet deep at the margin of the creek, and the ridges between them covered with fragments of rock. Solid rock also makes its appearance, in the steep bank of the creek in several places. The level from Tipton's was maintained to the end of the narrows, in order to avoid coming in contact with the stream, and enable us to cross those gullies as near their sources as possible.

This route did not by any means equal the expectations I was at first led to entertain of it, from description, as well as from a slight personal examination. My object in endeavouring to find an eligible route along the mountain side, was to obviate the necessity of crossing the Bald Eagle twice; but the result of the exploration was so unfavorable, that it was determined to return with the party, and make examinations with a view to crossing the stream above the Howardville bluff, if practicable.

The first route examined was one, by locking into the creek at Platcher's, and making slack-water by a dam at Gonsole's; but on running the level on the south bank of the creek, it proved to be so low, and the descent in the creek so rapid, that a dam at the proposed point for crossing, below Gonsole's bluff, would raise the water considerably above the level of the extensive flats on the southern bank.—This route was therefore abandoned.

The next point for crossing, that presented itself—although with little probability of success, was at Tipton's. On this route, a large portion of the flats above the proposed dam, would be overflowed—high guard banks would be required across the low flats bordering the stream—and the stability of the work rendered doubtful. This route would also be very circuitous, and at least one-third of a mile longer than that on the opposite side: in addition to this, by crossing the stream to avoid Shiptown bluff, Askey's bluff on the opposite side must be encountered. The latter is a bare limestone precipice, rising from the margin of the creek, along the face of which the line should necessarily be maintained at a disadvantageous level, in order to come on to the flats below, with a proper depth of cutting.

Route No. 2. At this stage of the survey, it became evident that the Howardville bluff must be passed by canal, as on route

No. 1.—The next object therefore was, to select a scite for the crossing dam, below both of the above bluffs. The most favorable scite is near Shank's bridge, at station No. 317, opposite the Howard furnace. This dam will be 180 feet in length, and 6 feet in height, and will flow the water to the upper end of an inlet of the creek on Butler's place. Lock No. 19, of $7\frac{1}{2}$ feet lift, is accordingly located opposite his barn, at station No. 304; from which point a channel will be excavated to the head of the inlet, and the line continued along the southern bank of the pool, to the public bridge, where it crosses, and the canal commences in Shank's meadow, immediately above the bridge.—The route then crosses the meadow obliquely, with moderate cutting; the material from this excavation can be thrown up on the lower side for a guard bank, on top of which the public road may be conducted. Lock No. 20, of 5 feet guard, is located next the ridge, at station No. 319. The line then crosses the road and continues over favorable ground, to station No. 347, at Rupert's, where lock No. 21, of 8 feet lift, is located. John Shank's house is in the direct line; and in order to save which, it will be necessary to form a birm-bank opposite to it, with a culvert, or pipe, to take of the drainage of the ground; as the surface of the water in the canal, will be two feet higher than the lower floor. The house is an old log building, and the better plan would be, to have it removed. The line is then continued over favorable ground, to station No. 384, where lock No. 22, of 9 feet lift, is located at Shaw's bluff, and depresses the line to the level of a pool proposed to be formed by a dam on the next lower division.

In consequence of the very unfavorable character of the ground on route No. 1, as before described, it would require great pains and expense, to construct a canal along the mountain side, and render it water-tight. Indeed with all the pains that could be at first bestowed on it, it is doubtful whether it could be rendered so, before the lapse of several years. Lockage would be particularly objectionable on this route, as in case it was adopted, it would be necessary to feed from the Bullet's run dam, to Nesselrode's, a distance of nearly 10 miles. The formation of the ground at the lower end is very unfavorable for locking down on to the flats, which are about 25 feet below the level of the bench, upon which the line was carried along the mountain side. In order to dispose of the great quantities of water, which at times rush down the mountain slope, it would be necessary to pave the top and slopes of the bank, on a large proportion of the whole distance; so as to permit the water to discharge itself over the bank, into the creek. The actual cost of this route, would depend in a very great degree,

upon the nature of the sub-stratum. Should that prove to be in part solid rock, or should the detached rock, with which the whole surface is covered, extend downwards to such a depth, as appearances would seem to indicate in several places—the difficulty and expense of construction would become very serious.—An accurate calculation of the expense, cannot be made, without a corresponding knowledge of the nature of the sub-stratum, which can only be acquired by excavating. Upon the whole, it is probable that this route would at least equal in expense that of No. 2, if not very materially exceed it. There is also a difference of 300 yards in point of distance, in favour of No. 2.

Nearly the whole of the northern route, is located at the foot of a gently sloping ridge, bordering extensive cultivated flats, and affording a choice of ground. Very little damage will be done to property:—the canal can be increased in width on a large portion of the distance, without incurring the expense of construction:—the soil is favorable for the retention of water, an abundant supply of which can be calculated upon to a certainty:—the objection to the long feeder on the mountain route will be obviated:—the distance diminished:—the trade of the surrounding country better accommodated, and two valuable water powers will be created at the dams at either end of the division.

Taking the relative advantages of those routes into consideration—Route No. 2, along the flats on the northern side of the creek, is entitled to a decided preference.

SEVENTH DIVISION—Commencing at Shaw's, and terminating at the Beech creek dam—length, 2. 90 miles.

Marsh creek, and Beech creek, both occur on this division, and have their sources in the vicinity of the Allegheny mountain. Marsh creek is the smaller of the two, but rises to such a height during the rainy season, as to admit of rafting on it—and enters the Bald Eagle at a point, $\frac{3}{4}$ of a mile below the upper end of the division.

A short distance below the latter point, the ridge diverges abruptly from the stream, leaving an extensive range of low flats between it and the creek. Across those flats, Marsh creek runs in a shallow channel. This circumstance taken in connection with its volume in rainy seasons, would render any mode of crossing it difficult and expensive. A route on this side would also be very circuitous, in consequence of the undulating character of the flats, and their limited height rendering it necessary to follow the course of the ridges, and keep such a level as would place the line above the freshets of the Bald Eagle:—in addition to which, the bluff bank at the upper end of the division, and another of considerable extent at Nesselrode's, would have to be encountered. This route would be at least three-

quarters of a mile longer, than one along the southern bank of the Bald Eagle. The latter side of the creek is undulating and irregular, but presents no difficulty of sufficient importance, to counterbalance the increased length of the line on the opposite side, and the difficulty of crossing Marsh creek.

Beech creek enters the Bald Eagle about $1\frac{1}{2}$ miles below Marsh creek. This stream drains a large extent of country, and has its source west of the summit of the Allegheny mountain. It is a formidable torrent in rainy seasons, overflowing its banks, which are similar in character to those of Marsh creek; and when at its highest stages, nearly equals the Bald Eagle in volume.

Under those circumstances, it was determined to cross the Bald Eagle, in order to avoid coming in conflict with those streams; and an experimental level was accordingly carried down, from Shaw's bluff, to the mouth of Marsh creek, in order to ascertain the capabilities of the banks on both sides, for slack-water. The examination resulted, as usual, in proving this mode of improvement inapplicable, without overflowing a large portion of the low cultivated flats, on the northern side of the creek, and extending high guard banks to the ridges:—and as there exists no serious obstacle to the construction of a canal, it was deemed inexpedient to locate the crossing dam, at a point lower on the stream, than where the banks were of sufficient height to insure stability. The dam is accordingly located at station No. 390, one-fourth of a mile below the outlet lock. A bridge will be required at the head of the pool, by which the towing-path will be transferred to the southern bank and continued along it to the dam, where the canal is again taken out on to Marsden's flats, and lock No. 23, of 5 feet guard, located. The line then passes over favorable ground, to a point nearly opposite the mouth of Marsh creek, where a slide from the mountain forms the bank of the creek. A cut of from 8 to 14 feet, on a distance of 80 perches, will be unavoidable at this place. It will not be difficult however, as the soil is composed of a fine gravel, mixed with loose rock, which will be required to protect the outside of the bank from abrasion. From the lower end of this slide, the line diverges from the creek with moderate cutting, and is taken along a narrow strip of marshy ground at the foot of a ridge, to Marsden's house, where it passes along the margin of the creek for a few chains, with 6 feet cutting. By a gentle deflection to the right, it there pursues its course over side-lying and undulating ground, to Nesselrode's house, in front of which it passes along a strip of marshy ground, and is then taken through his log barn, to the termination of the flats, at station No. 435, where lock No. 24, of 9 feet lift, is lo-

ated. This lock depresses the base line to the level of a pool, to be formed by a dam below the mouth of Beech creek. A towing-bridge will be required, in order to cross the stream, as the canal, from the latter place to the State dam, is located on the northern side of the creek.

Upon the arrival of the survey at the scite of the last mentioned lock, the lowest practicable level was assumed for the dam below: this level was then carried on to Beech creek, the north-eastern bank of which was found to be five feet higher than the assumed surface of the pool—and continued on to station No. 455, which point was fixed upon as the most eligible scite for the dam, after having previously examined the bank of the creek, on a distance further down. This dam will be 180 feet in length, and $6\frac{1}{2}$ feet in height above the bed of the stream. Its southern extremity will rest against the base of the Muncy mountain, and its northern end against an alluvial bank of moderate elevation, which will be further increased in height by a guard bank.

The route above described, combines economy with stability, and is the most direct route practicable between the extreme points of this division. The turbulent streams of Marsh creek, and Beech creek, will be avoided and passed by, as though they never existed; and at the same time an access to the navigation will be afforded, to the lumber and coal trade, of the surrounding country, at either end of the slack-water, created by the dam below the mouth of the latter.

EIGHTH DIVISION—Commencing at the Beech creek dam, and terminating at the head of the pool formed by the State dam, on the Bald Eagle side-cut—length 4.54 miles.

As the mode of improvement, recommended in a subsequent part of this report, from Beech creek to the head of the State pool at Brown's, varies very essentially from that suggested on a former occasion, by gentlemen whose opinions on those matters are entitled to the highest respect—I consider it incumbent on me to explain the motives by which I was influenced in coming to this result.

The Bald Eagle, below the mouth of Beech creek, becomes a stream of considerable magnitude, frequently rising to such a height, as to overflow the whole of the flats by which it is bordered. This fact I have had from the concurrent representations of several respectable inhabitants, who have pointed out places, where fences have been floated off, and crops destroyed by the floods, at a distance of nearly half a mile from the bank of the stream. The creek, or rather river, has an average descent on this distance of about 6 feet per mile, and is very tortuous in its course, making abrupt deflections from one side of the valley

to the other—leaving the great body of the flats however, on the northern bank. Along the foot of the ridges bordering those flats, a very favorable route for a canal presents itself, and is at the same time three-quarters of a mile shorter than that formerly suggested, by slack-water.

Slack-water navigation, on streams of this size, is a very desirable mode of improvement,—but then, it can only be adopted judiciously, in preference to an independent canal, when the banks of the stream are high, the descent small, and where the construction of a canal would be attended with difficulties.—When the character of the stream to be improved is the reverse of this, as in the present case—the limited height of the dams—the consequent increase of their number, together with guard locks, guard banks, towing-path, &c. swells the expense; and when taken in connection with the risk from freshets—creates so many exceptions to such a mode of improvement, as to render it totally inadmissible.

With the foregoing general view of the subject, I therefore came to the conclusion of examining a route for an independent canal, from the Beech creek dam to the end of the division.—This route commences at the dam with about 8 feet cutting, and is conducted across Elder's flat, to the foot of a low ridge, where lock No. 25, of 7 feet guard, is located, with corresponding guard banks. The route then pursues its course along the foot of a gently sloping ridge—with light excavation and embankment, to station No. 496, near John Quigley's house; where a limestone bluff which forms the bank of the creek, must be cut through, to a depth of 10 feet, on a distance of 200 yards. The line, after having passed this point, again diverges from the course of the stream, and runs along very favorable ground, through cultivated fields, to John Long's house, at station No. 509; where lock No. 26, of $9\frac{1}{2}$ feet lift, is dropped, in order to make available, what appears to be an ancient channel of the creek, which extends along the foot of a limestone ridge, about $\frac{3}{4}$ of a mile in the direction of our route, and will form a natural canal of from 50 to 60 feet wide, with a depth of 6 feet water, and at a very trifling expense. The line then crosses the valley of Plunket's run, with double embankments for a short distance—attains the foot of the ridge on the opposite side as soon as possible, and continues on favorable ground, to the head of a deep miry pond which occurs at the foot of the ridge, on Hoff's land, and which is about 300 yards in length, 40 yds. in width, and 2 feet below the bottom of canal. It will be necessary to flow the whole of this pond, by running the towing-path along the rising ground on its margin. The line then resumes its course, and in a short distance arrives at the head of

an extensive swamp, covered with water, on Welsh's land, at which point lock No. 27, of 6 feet lift, is located. This swamp extends through nearly the whole of the remaining distance, to the end of the division, and must be drained before the construction of a canal can be attempted through it. In order to effect this thoroughly, a ditch must be commenced at the river bank, and continued to the upper end of the swamp. Lock No. 28, of $6\frac{1}{2}$ feet lift, is located on the south side of the public road below Brown's, and forms the connection with the pool of the State dam; which at this place affords a depth of five feet of water.

The examination of this route resulted as satisfactorily as could have been expected. The character of the ground, with a few exceptions, is unusually favorable—the first cost will unquestionably be less, than by slack-water improvement—the work may be confidently calculated upon as permanent, being nearly altogether independent of the river—and what is a matter of great importance, the line according to former survey, will be decreased three-quarters of a mile in point of distance.—This route is therefore unhesitatingly recommended.

NINTH DIVISION—The pool of the State dam—length, 1.92 miles.

The State canal, and the Bald Eagle canal, both occur on the northern side of the creek at the respective ends of this division; and the towing-path along the pool, will also be constructed on the same side.

The towing-path can be formed at a comparatively small expense, as the banks of the stream on the greater portion of the distance, are of a convenient height. A bar at the upper end of the pool will require some excavation. Toward the lower end, an embankment will be required, on a distance of 200 yards, to cross a low piece of ground overflowed by the dam to the depth of three feet. Below this point, the towing-path will be formed along a slate bluff, to the end of the division, and the commencement of the State canal—where the location was terminated.

It gives me great pleasure to be enabled to state, that the general character of the valley is peculiarly favorable to the construction of a canal through it. Very little walling, rock, or deep excavation will occur—the soil is generally a tenacious clay; and stone and timber of a suitable quality can be procured in abundance. Previous to making the survey of this line, I had no conception, that a valley of the same extent, and with so great an amount of lockage, existed in Pennsylvania, presenting fewer difficulties, and affording as many facilities for the formation of a canal along it, as the valley of the Bald Eagle.

Fully impressed with the importance of this improvement, and the deep interest felt in it by you and the Board—I have thought proper at the expense of brevity, to present you with a full, detailed, and explicit statement, of my plans and views in relation to it. I would further state, that the conclusions arrived at, are the result of minute, and careful investigation, and I therefore, unhesitatingly, and respectfully, recommend them to the Board for their sanction.

I have the honor to be,

Sir,

your ob't serv't.

M. R. STEALEY.

Bellefonte,
Aug. 22, 1835. }

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ERRATA.

Page 7, line 23 from the top,
for Five do. do. do. read “Seven do. the residue.”

 This occurs only in some copies.